University of Tripoli - Faculty of Engineering

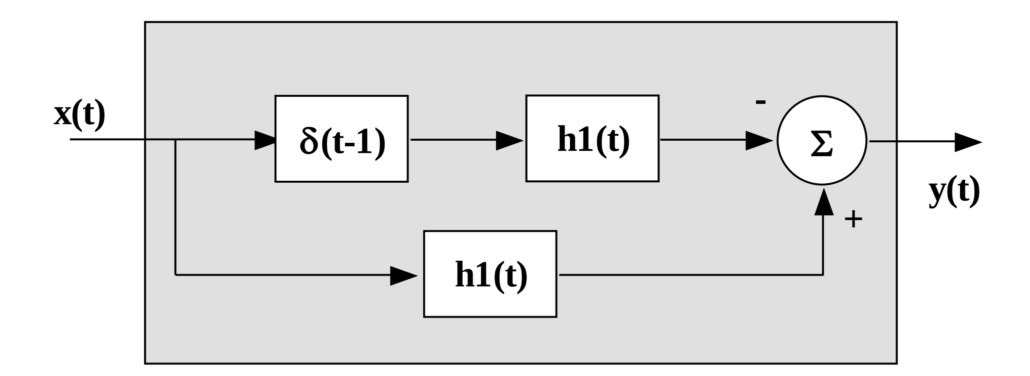
Department of Electrical and Electronics Engineering

EE302 Signals and Systems

2nd Mid-Term Exam, Fall 2017, 17 December, 2017, Time allowed: 1:30*h*

Answer the following Questions

[5] **Q1** – Consider the shown interconnected system, given that h1(t) =5 u(t) – 5 u(t-1) and the input x(t) = 3 δ(t) + δ(t-1), find the impulse response h(t) of the overall system and the output signal y(t).



[5] **Q2** – Given a DTLI system with the following impulse response

$$h_k = 4\left(\frac{1}{5}\right)^k + \left(\frac{1}{2}\right)^k \qquad k \geq 0$$

a) Sketch the block diagram of the system
b) Find the output of the system when the input is $x_k = 2\delta(k-4)$

[5] **Q3** – The exponential Fourier series of a certain function is given as

$$x(t) = (1 - j3)e^{-j5t} - j3e^{-j3t} + 6 + j3e^{j3t} + (1 + j3)e^{j5t}$$

a) Sketch the exponential Fourier spectra of the signal.
b) Find the trigonometric and the compact trigonometric Fourier series from these spectra.

GOOD LUCK